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Recreation Management and Development Plan

for

The Malpais Outstanding Natural Area

UNITED STATES
DEPARTMENT OF THE INTERIOR

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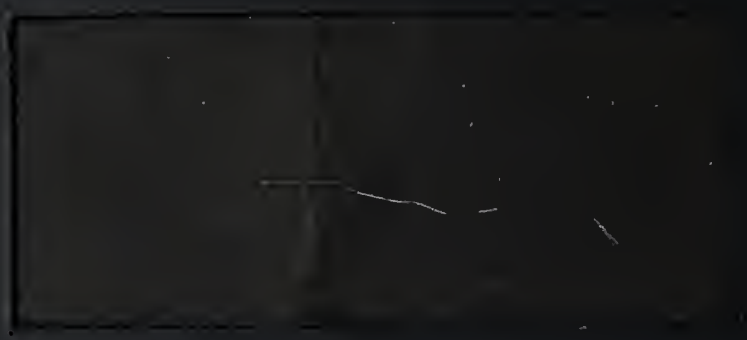

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Recreation Management and Development Plan

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The Malpais Outstanding Natural Area

New Mexico

Bureau of Land Management

Albuquerque and Socorro Districts,
New Mexico
October 24, 1972

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introduction

A. Introduction

1. Background

The Zuni Lava Fields in Western New Mexico contain a series of lava flows which are relatively young, geologically speaking, known locally as the Malpais (spanish meaning "bad country"). Many very unique volcanic and ecologic features are displayed in this rugged area which has been determined by the National Park Service to have National significance.

The Malpais Lava Flows are located in west-central New Mexico just south of Grants (See Plate 1). The younger flow area is approximately 30 miles from north to south and 15 miles from east to west.

A considerable amount of interest in the Malpais has been generated recently by residents of Grants and the surrounding area. Concern over the protection of the resources from irreparable damage initiated formal action to preserve the Malpais. In 1969, the Malpais was declared eligible for designation as National Natural Landmark. A field survey by the National Park Service followed and was culminated by a report "El Malpais, New Mexico, a Study of Alternatives", which stated that the area was suitable for inclusion into the National Park System with the status of National Monument.

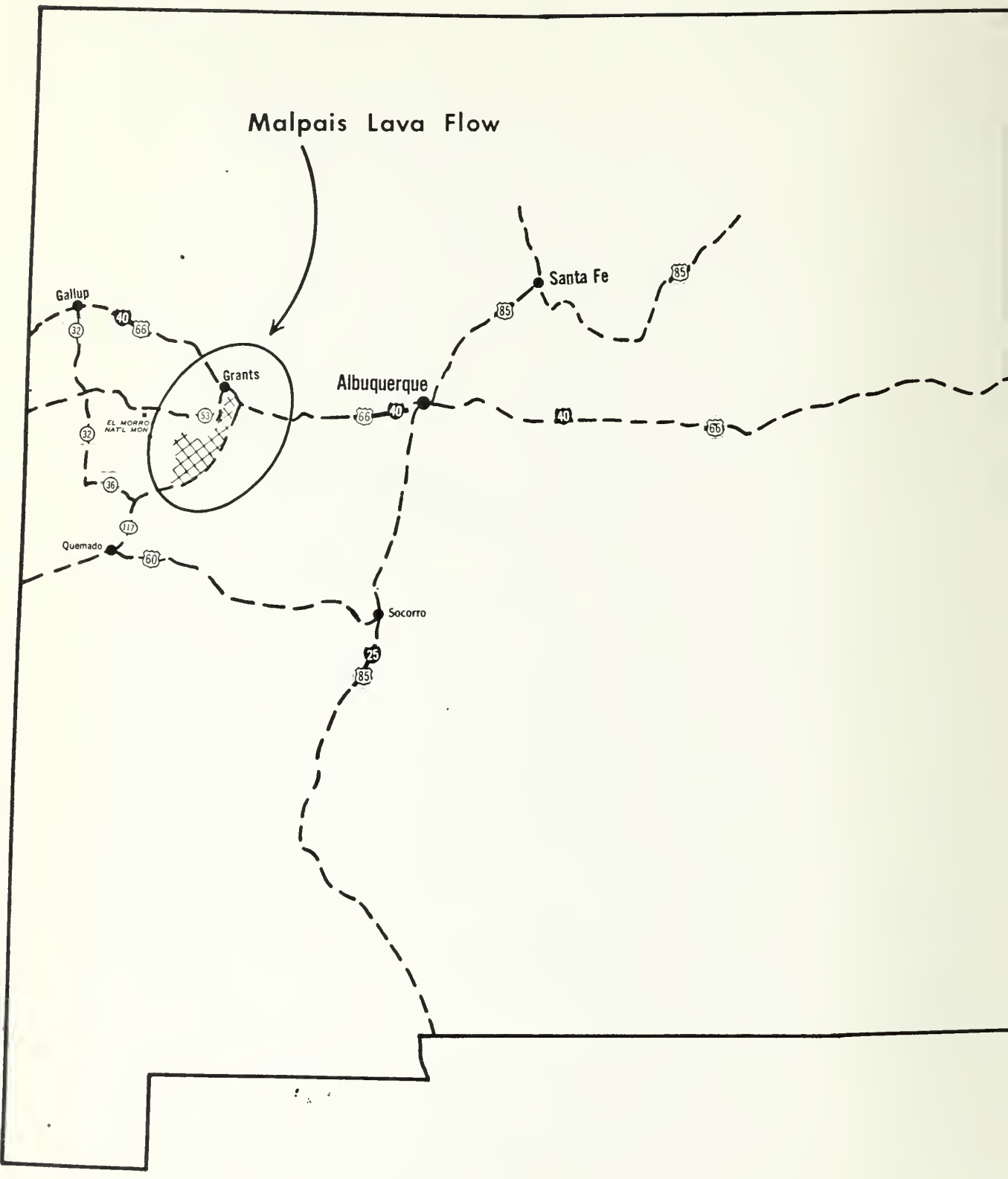

Malpais Lava Flow
Gallup
Grants
Albuquerque
Santa Fe
EL MORRO NAT'L MON
Quemado
Socorro
40
66
32
53
36
117
60
25
85

Plate 1

Subsequently, legislation was introduced into the Senate and House of Representatives for such designation. The status of this legislation is still pending as of the date of this writing. Implementation of this plan is totally dependent upon the outcome of the proposed National Monument.

One of the major obstacles in the effective protection and management of the Malpais is the mixed land ownership of the area included within the proposed Outstanding Natural Area (discussed later in this plan). Ownership is divided as follows: 53% administered by the Bureau of Land Management, 37% is privately-owned and 9.8% is State land. Much of this mixed ownership is in alternate sections.

2. Purpose

This plan is the Program Activity Plan for the recreation program. It is constrained and guided by the approved Malpais-Cebolleta Management Framework Plan (MFP). This plan is not intended to be a general land use plan covering all resource activities. However, consideration was given other resources where input was needed and when the MFP identified and resolved resource conflicts.

In this plan, significant features of the area are identified in more detail than the Unit Resource Analysis and particularly as these features relate to recreation potential. More

specifically, this plan presents a comprehensive plan for the development and management of a protection and interpretive program for the Malpais.

3. Objectives

The specific objectives of this Recreation Management and Development Plan are as follows:

a. Propose facilities which would be required to handle visitor use associated with the interpretive program. Detailed design is not provided in this plan but rather development concepts and where needed, standards required for development.

b. Propose personnel staffing required for the management of the area. Organization structure as well as staffing levels is identified.

c. Propose program of land and easement acquisition needed for effective management and protection of the Malpais.

4. Summary of Major Findings and Recommendations

Listed below is a summary of the recommendations for the area. More specific discussion is contained in the sections entitled "The Management Plan" and "The General Development Plan."

a. Designate the area which includes much of the significant lava flows as an Outstanding Natural Area. The area would be managed under the guidelines established in 43 CFR 6225 - Natural Areas. In this subpart, the

definition of Outstanding Natural Area Says

> "These are established to preserve scenic values and areas of natural wonder. The preservation of these resources in their natural condition is the primary management objective. Access roads, parking areas and public use facilities are normally located on the periphery of the area. The public is encouraged to walk into the area for recreation purposes wherever feasible."

b. Acquisition of land will be accomplished where possible to acquire significant features or to guarantee access to, or protect features and to provide integrity to the protection and management of the Malpais Outstanding Natural Area.

c. A protection program will be initiated to preserve the volcanic, ecologic and anthropologic features in their natural state. The program will consist of a public information program in the form of personal contact and signs. Eventually, if and when the Bureau of Land Management gets law enforcement authority, stricter management controls will be available.

d. An interpretation program will provide an explanation of the volcanic, ecologic and anthropologic features within the Malpais Outstanding Natural Area and the surrounding area. The program will utilize a central display at a visitor center and specific interpretation at significant sites. The only planned effort at interpretation by

personnel will be by a receptionist at the Visitor Center. Other interpretation by personnel will be incidental in the course of other duties.

e. Recreation use of the Malpais will be that which is primarily associated with interpretation of the area. No overnight accommodations, with one exception, will be provided initially. That exception is a small isolated primitive campground. Picnic areas, foot trails, scenic overlooks, restored archaeologic ruins and a self-guiding auto interpretive drive will be provided for the enjoyment of visitors. The concept of development is to provide the Malpais experience to a broad cross-section of the visiting public. Primitive trails will satisfy the rugged individualists and the auto interpretive drive and a nature trail will permit the elderly and handicapped an opportunity to view the area first-hand.

f. A combination Administration Site/Visitor Center will be constructed in a central location for administration of the Malpais and to provide public information.

g. Recreation developments will generally be located on the periphery of the Outstanding Natural Area in accordance with 43 CFR 6225 - Natural Areas. Certain existing trails and primitive roads within the boundary of the Natural Area will be identified, marketed and maintained for hiking and horseback riding.

h. A program of cooperation will be undertaken with landowners in the proposed Outstanding Natural Area to assure protection of the natural aspect of the area.

5. Environmental Analysis

An Environmental Analysis was not prepared as a part of this plan. It will be prepared upon approval of this plan and the result of the pending proposal for National Monument designation.

resource description

The eastern edge of the Malpais

wisted ponderosa
ine growing from
he Bandera Flow -
ite of the proposed
uto Interpretive
rail

Cerro Candelaria -
a classic volcanic
cinder cone

B. Resource Description

1. Physical Profile

A fairly thorough description of physical profile is contained in the Unit Resource Analysis of the Cebolleta and Malpais Planning Units. However, the following discussion is a summary of the area within the scope of this plan.

a. Terrain

The Malpais Recreation Management Area generally contains the Malpais lava flows. The northern and eastern boundaries of the area consist of moderate to steep terrain with a high mesa to the east which also marks the boundary of the Acoma Indian Reservation. To the west of the "young" lava flow lies a chain of craters starting at a point on the northwest corner of the flow (Bandera Crater) and running along the Continental Divide southwest for approximately 25 miles. South of the lava, the terrain levels off into high plains. The elevation ranges from 7,100 feet south of the lava to 8,300 feet on Cebolleta Mesa to the east.

b. Vegetation

There are four general vegetation types within the area; pinyon-juniper, mixed shortgrass, conifer and shrub type.

The pinyon-juniper borders the mixed shortgrass at slightly higher elevations. Included in the pinyon-juniper type is

the interesting and scenic Alligator Juniper (Juniperus deppeana). The conifer type occupies the higher elevations and sites where sub-surface water apparently exists in the lava flow. This type consists of primarily Ponderosa Pine (Pinus ponderosa) with some Douglas Fir (Pseudotsuga menziesii) and Aspen (Populus tremuloides).

c. Geology

The most significant and obvious geologic features are those of the historic volcanic activity of the area. A series of lava flows from many sources virtually filled the San Jose Valley with lava (Overlay #5). The youngest of these flows, the McCarty's Flow, is estimated to have occurred 600 to 1,000 years ago. Many geologists have commented on the significance of the recency of the flows. Within the United States, the display of volcanic activity of the Malpais is considered to be surpassed only in Hawaii where activity is still in process.

The flows of the Malpais contain many interesting features including an extensive network of lava tubes, through which much of the lava flowed, then drained thus leaving cylindrical cavities. Collapse of the tubes in many places has formed openings in the tubes. Some of these caves contain interesting ice formations.

Generally speaking, the display of volcanic activity in the Malpais is quite complete and has been studied extensively by geologists.

d. Climate

Accurate climatological data is not available within the Malpais area. However, nearby weather stations at El Morro National Monument and Grants-Milan Airport depict fairly closely the climate of the Malpais. However, the two stations probably represent the extremes in both precipitation and temperature of the Malpais. The higher elevation of El Morro probably reflects slightly lower temperatures. Lindsey, 1951 indicates that the temperatures within the younger lava flows are generally higher (above 5°F.) than adjacent areas. He also found that there are more frequent rains and possibly a greater amount on the lava than at comparable elevations outside the lava. This is explained as being due to the dark basaltic lava becoming hotter than the surrounding lighter-colored rocks. This heat buildup then promotes more active convection over the flow often resulting in more precipitation.

The mean daily maximum, mean daily minimum and average monthly temperatures are shown on the following table.

Table 1: Mean Daily Maximum and Minimum Temperature and Monthly Average Temperature (°F)*

Station	EL MORRO			GRANTS-MILAN		
	Max.	Min.	Monthly	Max.	Min.	Monthly
Jan.	41.9	11.9	28.0	43.8	12.2	29.1
Feb.	45.1	16.1	30.9	48.2	15.8	33.4
Mar.	48.6	20.4	36.8	52.6	21.2	39.0
Apr.	59.9	26.5	45.5	64.2	27.6	48.3
May	71.5	34.1	53.7	75.0	37.2	56.9
June	79.9	42.2	62.9	82.7	45.9	66.7
July	84.9	52.7	68.6	86.4	55.8	71.5
Aug.	80.4	50.4	65.9	83.0	52.5	68.7
Sept	74.5	42.3	59.8	76.8	44.2	62.0
Oct.	68.3	31.2	49.9	70.8	31.4	51.5
Nov.	52.5	21.9	37.5	54.9	20.6	31.5
Dec.	41.4	13.4	29.1	44.1	13.5	30.4
Annual			47.3			49.2

The table below shows the average precipitation and monthly distribution.

Table 2: Average Precipitation (in.) and % of Annual*

Station	EL MORRO		GRANTS-MILAN	
	Inches	% of Ann.	Inches	% of Ann.
Jan.	0.85	7.1	0.36	3.9
Feb.	0.66	5.5	0.36	3.9
Mar.	0.89	7.4	0.46	5.0
Apr.	0.68	5.7	0.43	4.6
May	0.42	3.5	0.44	4.7
June	0.51	4.2	0.69	7.4
July	2.07	17.2	1.63	17.5
Aug.	2.48	20.6	1.97	21.2
Sept	1.07	8.9	1.10	11.8
Oct.	0.90	7.5	0.91	9.8
Nov.	0.61	5.1	0.35	3.8
Dec.	0.88	7.3	0.59	6.4
Annual		12.08		9.59

* Data obtained from "Climatological Data, New Mexico", U.S. Weather Bureau, Jan. 1950 to August, 1970, records in the district files.

An analysis of the climatological data in the above tables indicates favorable temperatures for recreation from April through November. However, some negative factors are the typically strong spring winds in the area and the rain in the summer months. Over 50% of the average annual precipitation occurs as intense summer storms in July, August and September.

Prevailing wind across the Malpais is from the south and southwest. Wind velocity averages around 10 mph for the year and in spring average speed increases to 12 mph occassionally exceeding 25 mph.

e. Soils

The soils in and immediately adjacent to the lava are usually poorly developed and quite shallow. On the older flows where soils have developed, they are shallow over basaltic lava strata. These areas and bare lava areas would generally provide a good base foundation for building and road construction. Most of the soils in the lava area have good drainage and are not highly erodable thus suited for recreation site development.

However, in the archaeological areas to the east of the Malpais, soils are generally deep and loose and in many instances highly erodable when disturbed. In fact, some erosion is causing damage to some of the ruins. Great care would be needed if recreation use or development was

initiated in these areas.

It would be necessary to evaluate soils on specific sites prior to development or uses which may have an impact on the soils resources.

f. Wildlife

Within the lava area itself, wildlife is limited to some small game, an abundance of birds (non-game) and some mule deer in the more accessible areas. At one time, the lava area was believed to be Big Horn Sheep range. However, they were apparently killed off long ago. The area west of the lava along the Continental Divide supports a small population of deer and hunting is fairly light. The area to the east of the Malpais also supports a small population of deer. Hunting throughout the area is fairly light.

There is no surface water and thus no fisheries habitat.

A good variety of songbirds inhabit the areas which support stands of tall trees. Along the eastern boundary of the area there are many prairie dog towns. These are found in the loose, deeper soils.

Rattlesnakes are abundant in certain areas particularly where there is some developed soil.

g. Water Resources

There is no surface water in the Malpais. However, it is believed that a large subterrainean reservoir underlies the lava. However, there has been generally poor results from drilling in the Hole-in-the-wall.

h. Cultural Resources

1) Historical

Fort Wingate - built 1863 about one mile southeast of San Rafael. Kit Carson used the post as a base of operation while conducting his raids on the Navajos to the north. The site was abandoned in 1868 and moved to its present location, east of Gallup. No trace of the fort remains today.

Spanish Expeditions through the area

Coronado - 1539

De Onate - 1605 passed through on his way from "discovery" of the Gulf of Mexico.

De Vargas - 1692

Other Expeditions

Lt. J.H. Simpson, U.S. Army expedition

2) Archaeological - Archaeological values are located almost exclusively in the area just east of the Malpais. The sites fall, within two general sub-areas, Los Veteados and Los Pilares. The Los Veteados area is located about 35 miles south

of Interstate 40 and consists of about 20 square miles. About half of this area has been surveyed. Sixty-three sites were identified containing approximately 745 rooms.

The Los Pilares sub-area, an area of about 12 square miles, is located about 14 miles south of Interstate 40. Over 200 sites have been mapped, varying from one to 361 rooms in size with a minimum of 2,000 rooms total.

The area has been accurately dated by tree-ring methods and occupancy has been established from around 100 A.D. into the 1300's. Occupancy was predominantly an Anasazi population of Pueblo I to early Pueblo IV cultures. Debris of Basketmaker III were found but no sites have yet been found.

3) Land Status

About half of the land in the Malpais is administered by the Bureau of Land Management. Within the boundary for the proposed Outstanding Natural Area the land status is as follows:

Table 3

Public Domain	64,989.57	(53.1%)
Private	45,278.77	(37.1%)
State	11,966.72	(9.8%)
TOTAL	122,235.06 acres	

Overlay #1 contains the status by individual owners of private land.

The area within the boundary of the Natural Area does not contain any withdrawals.

The Malpais lava flows were declared as eligible for designation as a National Natural Landmark by a National Park Service Study Team. This status of "eligibility" is a step which then must be followed by a request by the land owner for a certificate and/or a plaque.

Narrows Arch

The Aa Foot Trail - an old Indian trail crossing a rugged Bandera Aa Lava Flow

A collapsed lava tube, with the resulting cave just east of Cerro Rendija

use analysis

C. Use Analysis

Recreation use of the Malpais has not been measured. The amount of recreation use and types of use is not known but it is believed that the amount of use is relatively low. This is probably due to the poor access and the lack of knowledge about the area. However, field observations have shown that the majority of use is by local residents particularly during week days. Thus, it is necessary to speak in terms of potential use when speaking of recreation use.

1. Regional Characteristics

In a description of the region, it is more meaningful to establish an area whose population would be apt to visit the site. The following analysis is based on data from the New Mexico State Planning Office. Potential recreation activities anticipated for the Malpais are listed in Table 4. The average distance which people were willing to travel for each activity has been used to determine an "area of influence." This area of influence is an estimated geolographical area from which resident users would visit the Malpais. Also shown is the percent of the population which participated in each activity.

Table 4

Activity	Distance travelled for activity (Miles-one way)	% of population participation
1. Picnicking	57	68%
2. Sightseeing	128	48
3. Hiking	61	32
4. Hunting	107	32
5. Camping (campgrounds, wilderness)	137	26
6. Horseback riding	NA	22
7. Nature study	NA	NA
8. Spaeleology (cave exploring)	NA	NA

The average "area of influence" is estimated at 130 miles driving distance from the Malpais. Thus it could be assumed that most of the regional recreation use would come from this area of influence (See plate 1).

The population of the Area of Influence is estimated at 443,000)based on 1970 census). Using the percent of participation figures from Table 4, the following number of residents is recognized as potential visitors:

Table 5

	Activity	% population participation	Population participation	No. participation per yr.	Total participation/yr.
1.	Picnicking	68	301,000	3.4	1,023,000
2.	Sightseeing	48	213,000	4.1	873,000
3.	Hiking	32	142,000	5.0	710,000
4.	Hunting	32	142,000	4.2	596,000
5.	Camping	26	115,000	2.8	322,000
6.	Horseback riding	22	98,000	12.8	125,000
				TOTAL	3,649,000

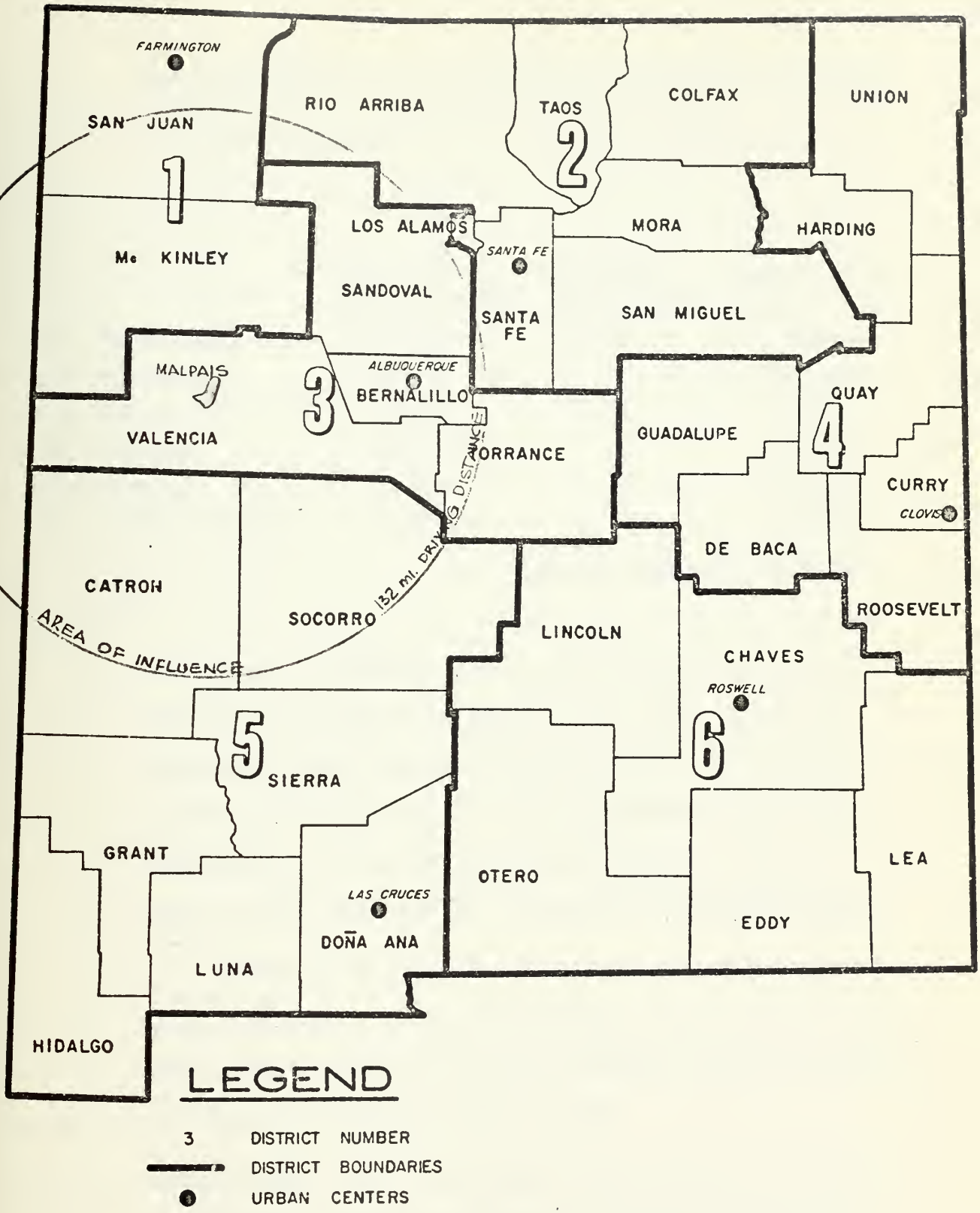


PLATE 1

NEW MEXICO PLANNING AND DEVELOPMENT DISTRICTS

Now by estimating the average length of stay for each activity, the total visitor days (12 hour) can be determined.

Table 6

		Total participation per yr.	Avg. Lgth* of stay (hrs)	Total Visitor days per year
1.	Picnicking	1,023,000	6	512,000
2.	Sightseeing	873,000	14	1,019,000
3.	Hiking	710,000	10	592,000
4.	Hunting	596,000	19	944,000
5.	Camping	322,000	54	1,449,000
6.	Horseback riding	125,000	10	104,000
			TOTAL VISITOR DAYS	4,620,000

The figure of 4,620,000 visitor days total for the area of influence by residents indicates the very heavy demand for recreation opportunities for the activities which would be available in the Malpais. It must be pointed out that this represents only the potential maximum demand by residents only. It does not consider non-resident or transient demand.

It is difficult to estimate the amount of demand from out-of-state travelers. It could be anticipated that because of the high traffic levels on I-40 and the Malpais close proximity to I-40 that the visitation would be high.

Actual visitor use of the Malpais, both present and projected is estimated assuming development of facilities beginning in fiscal year 1975.

Fiscal Year	*Visitor Days (12 hrs)
1972	4,500
1973	7,000
1974	11,500
1975	18,000
1976	30,000
1977	45,000
1978	59,000
1979	78,000
1980	110,000
1985	230,000
1990	450,000

* Does not include use at ice caves resort or other nearby facilities.

2. Access and Traffic Volume

The primary access to El Malpais is via Interstate 40 and two New Mexico State Highways which parallel each edge of the area. Secondary access from the south, U.S. 60 via State Highway 117 from Quemado, New Mexico.

The level of traffic on I-40 in 1970 was 8,175 annual average daily traffic (ADT) of which 70% of passenger cars were from out of state. Traffic levels on State highway 53 was 880 ADT south of San Rafael. No other traffic levels have been measured.

There is presently some road improvement on Highway 117. The New Mexico Highway Department plans to eventually pave Highway 117 from Quemado to I-40.

3. Existing Use

a. Recreation

Studies are needed to identify the types and quantity of recreation activities in the Malpais. However, observation

and discussion with users have provided a limited amount of information.

The most common recreation use is the illegal collection of artifacts particularly in the lava. It is quite a popular pastime to search the many depressions and caves in the outer fringes of the lava for ancient Indian artifacts. Most of these activities is by the amateur "pot hunter" on weekends during good weather. However, it is believed that a few individuals actually make a living from the pots they find in the area. Nearly all of the pot hunting is by local Grants area residents.

Sightseeing is quite a popular activity but is primarily restricted to highways 53 and 117 because of poor access to the remainder of the area. Much of this along with some picnicking and camping takes place at the Ice Caves resort.

There is a limited amount of deer hunting in the Continental Divide area west of the lava flows.

Another popular activity is spelunking or cave exploring of the many lava tube caves within the lava. This is usually by organized Spaeleological groups and by individuals familiar with the area.

In the sandy archaeological areas east of the lava there is a small amount of off road vehicle use, some of which

is probably related to the pot hunting activities.

The recent completion of the Kow-Ina Cultural Foundation Museum will probably result in increased visitation to the east side of the lava along Highway 117.

4. Factors Affecting Recreation Use

This section discusses various major factors which might have either a positive or negative effect on recreation use of the area.

a. Other nearby recreation attractions

There are two attractions in the immediate vicinity of the Malpais, the Ice Caves Resort and Kow-Ina Cultural Foundation. The Ice Caves Resort, a privately-owned commercial recreation attraction features trails through the lava to an ice cave and Bandera Crater. The resort also includes a cafe-museum and overnight accommodations. The Kow-Ina Cultural Foundation is a non-profit organization established to provide a center for study of the natural area and anthropological features of the Malpais area.

b. Access

One of the nation's major cross country highways (Interstate 40) is only a few miles to the north of the Malpais. Traffic volume has been discussed above. Access from I-40 is good to both the northern and eastern boundaries of the lava via State Highway 53

and 117. Access is also available via highway 117 from Quemado which is on U.S. 60, 45 miles south of the Malpais.

Secondary access to the western portion of the Malpais is via fair weather roads. These roads are largely impassable when wet. There are primitive jeep trails into some portions of the lava.

c. Hazards

One of the major problems and a very important consideration in managing for recreation use in the Malpais is the lava itself. The lava flows, particularly the younger flows are extremely rough and treacherous. Many of the attractions of the Malpais are contained in these younger flows where the only access is on foot. The lava is very rough and travel off developed trails is difficult and dangerous. The roughness and homogeneity of the terrain causes the Malpais to be a easy place in which to get lost. Even experienced hikers have been lost because the terrain looks much the same and the fact that the mineral makeup of the lava causes magnetic compasses to become unreliable.

Rattlesnakes are commonly found around the lava and on the older flows with developed soil. They present a potential hazard to visitors. Probably the best solution would be to inform visitors of infested areas.

On the eastern edge of the lava there are high sandstone cliffs which would pose a falling hazard.

d. Legal Problems

Because the access to the Malpais is from the perimeter and will involve many points of access, some of the access roads and trails cross land controlled by other than the Bureau of Land Management. It will be necessary to acquire easements where needed.

5. Conclusion

The Malpais and its surrounding area contains some very unique features. The display of volcanic activity is very impressive and some of the features including the ice caves, the suspected subterranean water reservoir, the concentration of craters, the variety of types and ages of flows and the Indian habitation associated with the lava. Some of these features are considered by scientists to be the only known examples within the United States. Conversely, many similar values are preserved and interpreted, primarily in the National Park System in other locations. However, there is strong justification for protection and interpretation of the values of the Malpais on a regional basis. The declaration of the Malpais for eligibility for designation as a National Natural Landmark is indicative of the National significance of the area.

The recreational use of the Malpais is continuing to increase without development other than the nearby Ice Caves Resort and Kow-Ina Cultural Foundation. The Grants-Western Valencia County Chamber of Commerce continues to publicize the area. Illegal pot hunting has increased substantially since 1969.

Immediate action must be taken to protect the area from the existing recreation pressures and from other conflicting resource uses before many of the values are irreversibly destroyed.

the management plan

D. THE MANAGEMENT PLAN

This section of the Malpais Recreation Plan outlines the approach to recreation management of the Malpais. No attempt will be made to provide detailed planning or design of any of the developments.

1. Management Zones

The area within the scope of this plan has been divided into management zones. These zones identify an area for which management objectives are provided. (See overlay #2).

a. Natural Zone - for preservation and protection of unique natural values. Other limited uses are allowed but only if they do not conflict with the primary purpose of protection of natural values.

b. Travel Zone - this zone is to identify access corridors for road and trail development and maintenance required for recreation use. This area within this zone would be managed to provide safe and easy access by vehicle or foot while maintaining the aesthetic values adjacent to the developments.

c. Open Space Zone - this zone identifies an area important to the natural setting of the area. Other uses would be allowed but only when not deleterious to the aesthetic values. Management restrictions would not be as strict as those for the Natural Zone.

d. Recreation Development Zone - These areas will provide recreation facilities including picnic units, scenic overlooks and interpretation devices.

e. Administrative Zone - this zone includes a visitor center/ administrative building complex with supporting facilities for maintenance and operation of the area.

f. Cultural Zone - this zone delineates the area where a great number of archaeological sites exist. This area must be inventoried and sites identified. A protection program will then be initiated to protect significant ruins from damage.

2. Resource Management

General guidelines for management of all the resources are contained in Step 2 of the Management Framework Plan for each resource.

A program of land exchange will be initiated where specific parcels are needed to insure protection of the values of the Malpais and where recreation developments are proposed. Land acquisition willbe initiated in a timely manner prior to such development to provide sufficient lead time. Ultimately, it would be desirable to acquire all lands within the Outstanding Natural Area. However, this may be an unrealistic goal. Appendix 1 contains a list of parcels of land which should have the highest priority for land exchange. Appendix 2 lists rights-of-way which should be acquired for legal access.

Appendix 3 contains the legal description for the proposed Malpais Outstanding Natural Area and overlay #3 displays the boundary.

Management of the Outstanding Natural Area and development within

the boundary will be in compliance with CFR 6225 - Natural Areas. An Outstanding Natural Area is defined as an area "established to preserve scenic values and areas of natural wonder." The preservation of these resources is the primary management objective. Public recreation use may be allowed if such use will not result in degradation of the natural values.

Generally speaking, a multiple use concept of resource management will continue to be used within the Outstanding Natural Area. However, some uses will be restricted or carefully controlled to insure that disturbance to surface values are kept to a minimum. More specific restrictions are contained in the Malpais - Cebolleta Management Framework Plan (MFP).

A buffer zone is proposed for travel corridors and the area immediately adjacent to the proposed Outstanding Natural Area. This zone is intended to provide protection of surface and aesthetic values yet allowing resource uses which would be compatible with the Outstanding Natural Area. Management restrictions would permit livestock grazing but with no additional livestock management facilities, no mineral material sales, carefully evaluated watershed structures, etc. Of course, as in the case of the Outstanding Natural Area, management restrictions would pertain only to public lands administered by the Bureau of Land Management. The proposed Buffer Zone is on Overlay #3 and the legal description is included in Appendix 4.

The area of the Malpais in the extreme northwest corner is entirely privately owned or part of the Cibola National Forest. For this reason the area was not included within the proposed Outstanding Natural Area. However, the area contains significant features which are important to the contunuity of protection and interpretation of the Malpais.

Appendix 5 contains the legal description and overlay #3 shows the boundary of this supplemental area. It should be the goal of the Bureau of Land Management to acquire these lands if they become available. In the meantime, cooperative efforts with the respective landowners for the protection of the area should be initiated.

3. Visitor Management

This section contains objectives for the management of recreational uses for the area.

a. Public contact and information contact with the public will be handled in many ways. Recreation information centers where general information and emergency help is available should be located on main access routes to the Malpais. Initially, a combination visitor center and administration building will be located on the edge of the lava adjacent to Highway 53 near Bonita Canyon (See Recreation Development Overlay #4). This site will act as a focal point for public contact. The visitor center run by the Kow-Ina Cultural

Foundation is available to give information on the Malpais.

The visitor center will be manned to meet visitor demand to provide the best possible service to the public.

A detailed sign plan will be developed concurrently with design of recreation facilities and roads and trails.

A very important aspect of public contact is the personal contact by BLM employees. Maintenance personnel will be trained in public relations so that they may provide effective communications contact throughout the area. As use of the isolated areas increases, it may be necessary to initiate patrols in order to protect facilities and ruins from vandalism and to insure public safety. Hopefully these patrolmen would be authorized law enforcement officers.

b. Interpretive Plan

An interpretive plan will be developed to identify the geologic, ecologic and anthropological features which are suitable for interpretation. The plan would also recommend the media to be used and include the design, but not construction of interpretive displays and facilities. The interpretive program will utilize various media including display panels, models, brochures, and signs.

The interpretive plan will be developed under contract with a commercial firm experienced in the field of interpretation of natural and historical values. A suggested

theme outline is shown below:

INTERPRETIVE PROGRAM

Themes

I. Volcanology of the Malpais

1. Number, types, ages and successional stages of lava flows (see overlay #5)

2. Formation of Volcanic features

a. Lava tubes
b. Ice Caves
c. Kipukas
d. Cinder cones
e. Spatter cones
f. Volcanic products

II. Ecology of the Malpais

1. Vegetation/lava relationships

2. Wildlife in the Malpais

3. Climatic conditions/relationships with vegetation

III. Anthropology of the Malpais

1. Indian habitation/life style, etc.

2. Spanish Explorers

3. Mormon pioneers

c. Visitor Protection

As discussed earlier, the rugged nature of the Malpais is a safety hazard for people who wander out into the "black lava." An effective information program is needed to warn people of these hazards and advise them to stay on the trails. This can be done by personal contact, brochures and signs. The effectiveness of this program will be reflected in the need for search and rescue efforts. The rugged terrain would not allow effective search and rescue efforts by personnel on the ground. Arrangements will be

made with flying services for fixed wing aircraft or helicopters as needed. This aerial search will then be coordinated with ground personnel by radio.

A major operational problem of the Malpais and the adjacent archaeological areas is the lack of law enforcement authority. Protection of Indian ruins and recreation developments cannot be truly effective unless BLM law enforcement officers routinely patrol the sensitive areas.

Communications will be provided by a two-way radio system utilizing the same frequencies currently in use. Existing repeaters can be utilized to give good coverage within the placement of a base station at the Administrative Building. All vehicles will contain mobile radio units.

Sanitation will be handled at all sites where concentrations of people occur. These locations include the visitor center, picnic sites, campgrounds, major overlooks, and trail heads. Garbage cans will be used for solid waste disposal which will be emptied at regular intervals as use dictates. Toilet facilities will range from flush toilets in the visitor center, to vault-type toilets at major sites (picnic/campgrounds) to portable, self-contained units at trail heads and other smaller sites.

Fire control policies for the Malpais are outlined in Step 2 of the Management Framework Plan. Briefly summarized, fires will initially be manned only with a fire watch to monitor fire spread, etc. Due to fragile nature of much of the area and the established policy for protection of the surface values, fires will not be controlled except where they threaten developments or a marketable timber management area or where fire would cause considerable damage to resources.

Emergency first aid will be available to visitors to the area by field BLM maintenance and patrol personnel who will be trained in first aid. The Grants Hospital is close by and can provide medical services for serious injuries.

Traffic control is not expected to be a problem in the Malpais for the initial years of development and visitation. A traffic sign system will be used for traffic control. In addition, road design and location will be such that anticipated traffic loads and flow can be handled effectively. The use of loop roads, one way traffic and wide major routes are examples of design which can aid in traffic control.

d. Commerical Services

The Ice Cave Resort is presently the only commercial recreation development near the Malpais. This development

is discussed elsewhere in this plan.

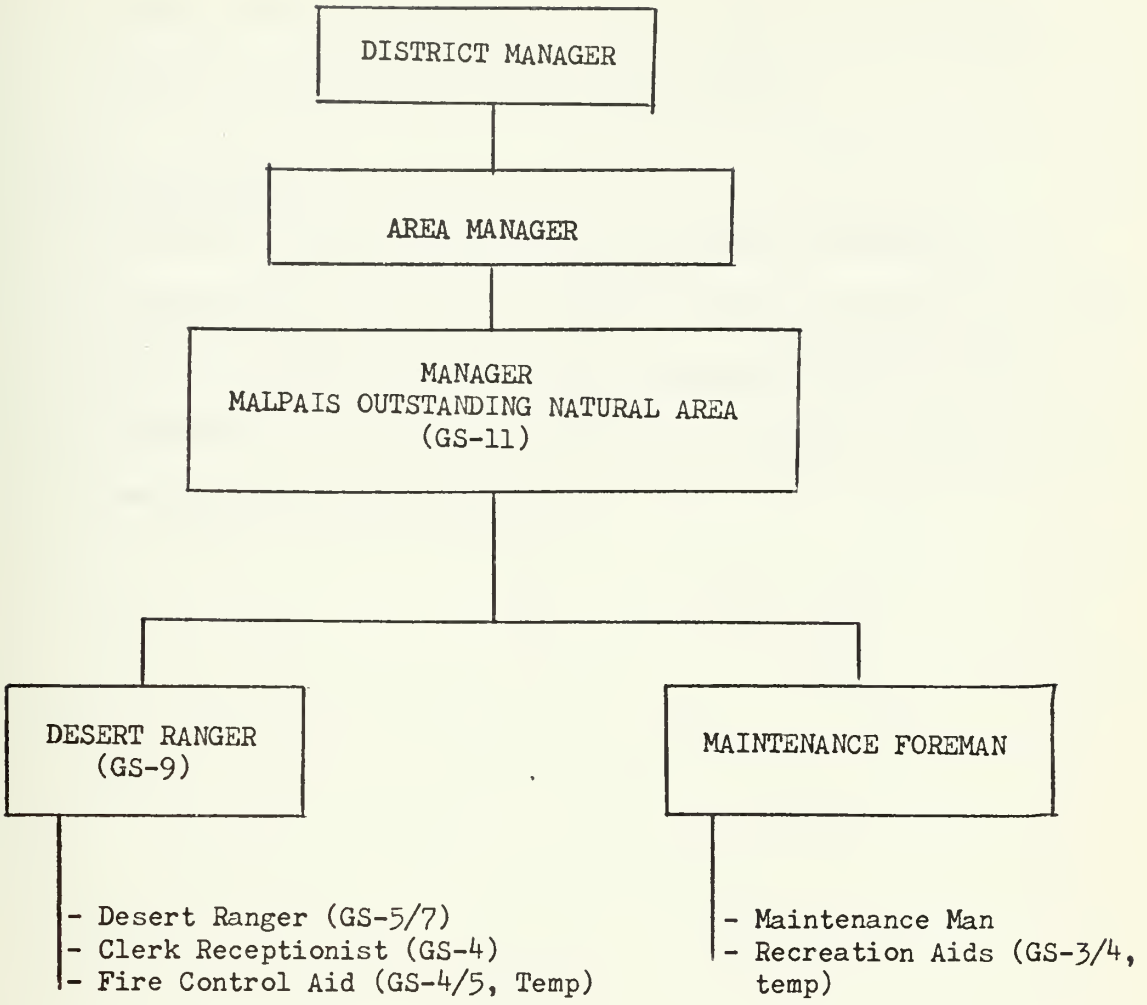
It is not anticipated that the BLM will enter into any formal agreements with any commercial establishments; i.e., concessionaire contract.

It would be desirable that any commercial campgrounds or other facilities which may be developed in the Malpais area on private or state lands, be compatible with the theme and management of the Malpais. It is possible that zoning regulations which could be implemented by Valencia County would assure the proper building restrictions. This avenue should be explored.

4. Administrative Management

The operation and maintenance organization responsibility of the Malpais Outstanding Natural Area will fall within the Resource Area. The Manager of the Outstanding Natural Area will report directly to the Area Manager.

The ultimate organization structure is shown below. This organization assumes total development as discussed under the General Development Plan Section.



Administrative facilities which will be provided include a combination administration building/visitor center. This will provide flexibility for utilization of personnel for administrative support and public information and interpretation. Housing will not be provided except for temporary quarters for duty or stand-by personnel. Small dormitory accommodiations are planned for the administrative building. A warehouse and yard complex will be constructed in the vicinity of the administrative building to provide maintenance and storage facilities.

A more detailed discussion of these facilities is included under the General Development Plan Section.

5. Maintenance

Maintenance will be done with BLM permanent personnel to be supplemented by temporary personnel during the heavy use season. However, some routine maintenance responsibilities may be handled on a contractual basis, i.e., pumping of vault toilets, building maintenance, etc.

the general development plan

E. The General Development Plan

This portion of the plan is intended to identify general development concepts rather than detailed construction design. However, in some cases, design standards are proposed.

As was discussed earlier, recreation construction must not conflict with the primary management objective of protecting the natural values of the area. The proposed recreation facilities will provide the Malpais experience to a wide range of visitors, from the casual sightseers to the serious nature study buff. Easily accessible auto and foot nature trails will be available with interpretive displays to interpret the volcanology, ecology and anthropology of the Malpais. For the recreationist desiring the more primitive experience, foot trails built by Indians hundreds of years ago across vast expanses of rugged lava will be marked with native materials and minor improvements made.

1. Development Guidelines

In order that recreation development not adversely affect the Malpais environment, the extent of development must be kept within the parameters which will not exceed the recreation carrying capacity of sites or areas. No simple method exists for determining carrying capacity prior to development. One technique which could be used in the Malpais is to plan initial development at a low intensity. This would provide an opportunity for management personnel to evaluate the condition and trend of the environment as affected by recreation use.

It is important that the carrying capacity of any site or area be evaluated from two viewpoints: First, is the effect of recreation use levels on the resources, vegetation, soil, geological formations, archaeologic sites, etc.; Secondly, the effect on the aesthetic environment or on the experience of the user.

Architectural themes should be followed on a site by site basis. Facilities at the great kiva should follow Pueblo Indian architecture, facilities interpreting the volcanic features should utilize lava building rock, etc.

Construction of facilities should be made as rustic as possible in such a manner that a "Natural Area" theme is maintained. Native building materials should be used wherever possible.

The Visitor Center should be of southwest architecture utilizing natural wood and lava rock. The building would best be located and designed to provide a good view of the Malpais. The maintenance facilities should be close to the Administration Building/Visitor Center yet effectively screened from view by vegetation or topography.

The proposed roads for the Malpais fall into basically two types, access and nature or sightseeing roads. All access roads except the West Side Drive Road should be designed for 25 mph speeds. Long tangents which encourage higher speeds should be

avoided. The West Side Drive Road should be designed for 45 mph. Road design should be accomplished by a team including an engineer, landscape architect and a recreation planner to insure that aesthetic characteristics of adjacent lands are preserved. Consideration must be given the fact that these roads are not just access roads but important scenic corridors for recreationists. Heavy cuts and fills should be hidden or designed to be aesthetically pleasing.

2. Road Systems

The proposed road system for the Malpais is intended to provide recreation access to recreation sites and important natural features. Roads with expected heavy to moderate use will be constructed to a standard of a 24' wide paved surface. Secondary access roads to lesser used sites will be 24' wide gravel surface all-weather roads.

The following is a summary of the proposed road system identified by road and standard:

	Road Name	Mileage	Width	Surface
1.	Administrative Site	0.5	24'	Paved
2.	Bandera Auto Interpretive Trail	3.5	24'	Paved
3.	Bat Cave Access Road	0.7	24'	Paved
4.	El Calderon Access Road	1.7	24'	Paved
5.	West Side Drive	30.0	24'	Paved
6.	Cerro Rendija Road	4.5	24'	Paved
7.	Aa Lava Trail Access Road	6.0	24'	Gravel
8.	Hole-in-the-Wall Road	19.0	24'	Gravel
9.	Mesita Blanca Trail Access Road	1.4	24'	Gravel
10.	Narrows Overlook Access Road	3.2	24'	Paved
11.	Narrows Arch Access Road	0.4	24'	Paved
12.	Cliffs Picnic Area Access Road	2.4	24'	Paved
13.	McCarty's Trail Access Road	1.6	24'	Paved
14.	Great Kiva Access Road	0.7	24'	Paved
	Total Mileage	75.6		

See overlay #6 for the location of these roads. Only two of these roads, the Narrows Overlook Road and the Bandera Auto Interpretive Trail are new construction. The other roads will be up grading of existing roads except where realignment needs to be changed.

3. Trail System

The proposed foot trails fall into two categories: self-guiding interpretive nature trails and hiking trails. The Kipuka Interpretive Trail will be constructed to facilitate use by wheelchairs. The trail surface will be 4 feet wide and hard surfaced with blacktop, hard clay or even elevated boardwalks. The latter could be used across rough lava so

that surface disturbance is minimal. The grade on these trails should not exceed 3% and guardrails or handrails will be used where necessary. Benches will be provided at logical resting areas.

4. Utilities System

Only three sites will initially be provided with utilities. The primitive campground at Cerro Encierro and the Cliffs Picnic Area are located considerable distances from potable water sources. Since the Cliffs Picnic Area may be used as a campground at a later date, drinking water should be developed. The other picnic areas will be developed initially without water primarily because of the high cost and uncertainty of water availability. No other utilities will be provided at these sites. The third site is the Administrative Building/Visitor Center. A water system will be constructed to supply water to the Visitor Center and the Maintenance Yard.

Electric power and telephone service will be provided to the administrative site only. The sewage system for the administrative site will be a septic system or self-contained treatment system depending upon soil conditions.

The existing New Mexico BLM radio net system will be utilized with the addition of a base station at the Visitor Center with repeaters as necessary to provide complete radio coverage of the Malpais. All vehicles will have mobile units.

5. Interpretive Facilities

The types and design of interpretive facilities to be used will be outlined in the Interpretive Plan as discussed earlier.

The sites at this time which are considered to have potential for interpretation are:

1. Visitor Center
2. Kipuka Interpretive Foot Trail
3. Bandera Auto Interpretive Trail
4. Bandera Flow Overlook
5. Bat Cave
6. El Calderon Cinder Cone
7. Bandera Crater View Point
8. Cerro Rendija Trails
9. Aa Lava Foot Trail
10. Cerro Encierro Trail
11. Narrows Overlook
12. Cliffs-Natural Arch Trails
13. Great Kiva

The level of interpretive facilities development may vary from small signs to elaborate displays and models.

6. Site Development

There are 17 sites which are proposed for recreation development. Initial development will be kept to a minimum in order to evaluate demand and carrying capacity as part of a dynamic planning process for the Malpais.

Site design and development should be accomplished with this concept in mind. Appendix 6 summarizes briefly the development for each site.

Overlay #4 shows the location of each of the sites. A development schedule is shown in Appendix 7.

Administrative Site/Visitor Center

The Administrative Site is located on State Highway 53, the principal access to the Malpais. This highway provides access from I-40/U.S. 66 at Grants. It was decided that operation/maintenance and visitor information facilities should be located adjacent to the Malpais on Highway 53.

The site will serve generally three functions: 1) Administrative facilities for the operation and management of the Malpais, 2) maintenance facilities, and 3) a visitor information center.

The administrative facilities and visitor information facilities have been combined into one building for most efficient use of space and personnel.

More specific functions to be served by the building are to provide:

1. Office spaces for management and administrative personnel
2. Living quarters for duty personnel
3. Central interpretive site
4. Visitor information
5. Central contact point for emergencies

Space needs for the building area are as follows:

Offices	670 sq.ft.
Interpretive Area	1,800 sq.ft.
Toilets (public)	400 sq.ft.
Living quarters	1,200 sq.ft.
Misc.(storage, furnace, etc.)	120 sq.ft.
TOTAL	4,190 sq.ft.

Interpretive and information displays and maps will be provided in the building. The overall story of the Malpais could be interpreted here. Location maps would be displayed and a receptionist would be on duty for assistance and fee collection if appropriate.

The Visitor Center would include a parking area for not less than 50 cars and recreation vehicles. Landscaping and access would be provided by a paved road from Highway 53.

The maintenance complex would serve the following functions:

1. Vehicle storage (about 10 vehicles)
2. Equipment storage
3. Flammables storage (small metal shed)
4. Supplies and material storage
5. Workshop/maintenance area
6. Fire cache
7. Vehicle washing/maintenance facilities

Space needs for the maintenance complex are as follows:

Warehouse	3,200 sq.ft.
Flammable Storage Bldg.	400 sq.ft.
Yard	6,000 sq.ft.

Utilities which will be provided for the Administrative/Maintenance Complex are electric power, water system, sewage system, telephone service and a radio system which will tie in with the State BLM radio net.

Kipuka Interpretive Foot Trail

This trail will be a self-guiding nature trail across various types of lava. Interpretation will be primarily of the lava, lava-vegetation relationships and other features. This hard surfaced trail will be designed to standards allowing wheelchair use and will provide an easy walk, yet provide the unique Malpais experience for the visitor.

A parking area for about 10 cars will be located at the head of this loop trail of about 1½ miles in length. A shorter alternative loop trail will also be provided.

Bandera Auto Interpretive Trail

This drive is designed to enable persons unable or unwilling to walk the foot trails with the opportunity to view the scenic and unusual features of the lava field. The features will be identified and explained by a brochure keyed by roadside markers.

The terminus of the road will be an overlook on a limestone ridge with an interesting view of the "young" Bandera Lava flow.

A few picnic tables and toilet facilities will be placed in a scenic location near the end of the road.

Bat Cave

This intact lava tube has easy access to provide a potentially very popular attraction. The cave is about 1/3 mile long and supports a bat population. It is proposed that a foot trail be constructed through the cave with the cave lighted so walking would ve easy and safe and to provide interpretation of the formation of lava tubes.

El Calderon Cinder Cone

El Calderon provides a classic example of a cinder cone of the Malpais area. An existing road and parking area will be upgraded and a nature trail constructed around the rim of the crater. A series of interesting lava tubes as well as unique plant ecology relationships will be interpreted.

Bandera Crater View Point

A small parking area will be constructed on the West Side Drive where the road passes near Bandera Crater. Bandera Crater is one of the most outstanding Craters in the Malpais area and warrants interpretation. The parking area need only accommodate a few cars with a modest interpretive display nearby.

Cerro Rendija Picnic Area/Trail System

A foot trail system of about 5 miles in length is proposed to provide the hiker access to the most interesting and extensive lava tube systems in the Malpais. Explanation of the lava tubes would be provided in signs and displays. The trails would lead

to lava tubes in a young flow and older flow and to the top of Cerro Rendija for a spectacular view of much of the Malpais.

A small picnic area with just a few sanitation facilities and a parking area would be located in a central location in the trail system at the lava's edge.

Aa Lava Foot Trail

This trail is largely an existing trail which was built by the Indians for access across the lava. It crosses a very rugged expanse of Aa lava. The trail will be improved only slightly in order to preserve the historic value but natural looking trail markers will be used.

Access will be provided to both trailheads via all-weather gravel roads. At each trailhead, a parking area for about 4 cars will be constructed along with a vault or portable toilet.

Mesita Blanca Trail

This proposed foot/horse trail is presently a primitive road which will be closed to vehicular traffic. The trail will follow the alignment of the present road with a few exceptions. Construction standards for horse trails will be used. A small parking area will be built at each trailhead along with a small holding corral for horses and portable toilets. The trail will be about 4 miles in length. Access will be provided at each trailhead by a gravel road.

Cerro Encierro Campground

This campground consists of about 6 primitive units, each with a rustic table, garbage can, tent pad (dirt or gravel) and a parking site. A small water system is needed because of the remote location and lack of available water. One double-seat vault toilet will be located in the campground.

A foot trail (about 0.3 mi.) will be constructed from the campground to Cerro Encierro, a volcanic cone, from which there is an excellent view of the Hole-in-the-Wall area and adjacent lava. A small interpretive display will be located at the viewpoint on Cerro Encierro.

Narrows Indian Trail

This is another of a series of old Indian trails which traverse the younger, more rugged lava. The trail connects the Hole-in-the-Wall with the Narrows on Highway 117. The trail is poorly marked and not too well defined and will require improvement, particularly in the rougher areas.

Other developments include a small parking area to handle about 4 cars at both trailheads with a single seat vault or portable self-contained toilet at each parking area.

Narrows Overlook

The location for this overlook is a sandstone ridge 500 feet above the rugged McCarty's flow. This point provides the most

spectacular and unobstructed view of the Malpais.

An overlook shelter with a modest interpretive display will be located near the edge of the cliff with a protective fence providing safety measures. A parking area to hold approximately 20 cars and a small picnic area of about 3 family units will be situated near the overlook, about one-half of the 3.2 mile paved access road will be new construction as an existing unimproved road provides partial access. Sanitation facilities will be provided by a 2-seat vault toilet.

Narrows Arch Viewpoint

This natural arch is the largest and most spectacular of the arches in the sandstone formations along the eastern boundary of the proposed Outstanding Natural Area boundary. The proposed short, paved road will provide access to a good viewpoint for sightseeing and photography. A parking lot for about six cars and a small interpretive display will be constructed at the site.

Cliffs Picnic Area

This area is situated on top of a sandstone cliff overlooking the McCarty's Lava Flow. The cliffs contain at least two natural arches and many interesting formations. A picnic area with about 12 units is proposed for the site. A small water system, including a well, pressure system and pipeline to the picnic area will be developed. Two double seat vault toilets are planned.

A parking area to hold about 10 cars will be located adjacent to a small overlook display shelter and a short foot trail.

This area has good potential as a campground and if overnight facilities are required along Highway 117, this area should be considered. The design of the picnic units should consider the possible future accommodation of overnight camping use. The water system should be designed to handle projected higher demands if camping is allowed at a later date.

McCarty's Trail

The site is primarily a trailhead for a system of hiking trails along the edge of the lava with one to a small kipuka (island). These trails will have small interpretive displays of the lava and ecologic features of the area. Connecting trails will be developed to the Cliffs Picnic Area and the Great Kiva Site. A parking area to accommodate about 10 cars will be located next to the trailhead.

Great Kiva Ruins

A significant ruin, this kiva could be a major attraction of the area. The primary emphasis for this site is excavation and some restoration of the kiva and adjacent ruins. This work will be done for both scientific and interpretive purposes.

To outline work in more detail, the Great Kiva will be excavated and partially or wholly restored. The excavation will be done so that the work itself will be interpreted to the public unless protection becomes a problem. Next, emphasis will be

placed on excavation of adjacent ruins and restoration of the Great Kiva. The extent of restoration will be determined by its value for interpreting the significance of the Kiva and its use by its Indian inhabitants.

Other sites along the sandstone cliffs southeast of the Great Kiva should be evaluated for possible excavation and restoration. These sites would provide additional attractions near a proposed foot trail along the cliff top.

An interpretive display shelter would provide displays of the early inhabitants, their life style and interactions with the Malpais. This display would be located in a central location with a parking area for about 20-30 cars and one double-seat vault toilet. Other smaller interpretive displays would be located at all ruins. This site will require frequent patrol and attention by maintenance personnel because of the fragile nature of the ruins and the anticipated visitor pressure.

As was mentioned earlier, development of this site is dependent upon the success of acquisition of the state and private land on which the ruins lie.

appendices

Appendix 1

Priority Parcels for Land Acquisition

State Land	
T. 8 N., R. 12 W.	
Sec. 36: All	640
T. 7 N., R. 11 W.	
Sec. 2: All	640
Total State	1,280 acres
Private Land	
Arizona-New Mexico Land Co.	
T. 8 N., R. 12 W.	
Sec. 23: N½	320
Sec. 13: S½, S½N½	480
Sec. 9: All	640
T. 7 N., R. 11 W.	
Sec. 1: All	640
T. 8 N., R. 11 W.	
Sec. 13: All	640
Sec. 1: S½	320
Josephita and R.B. Candelaria	
T. 9 N., R. 9 W.	
Sec. 29: S½SW¼, SW¼SW¼	120
Mike Porter	
T. 8 N., R. 10 W.	
Sec. 6: N½	320
Total Private	3,480 acres
U.S. Forest Service Land	
(Cibola National Forest)	
T. 9 N., R. 11 W	
Sec's. 30, 31, 32, 33	2,560
Sec. 29: S½, S½N½, NW¼NW¼	520
Sec. 28: SW¼, SW¼SE¼	200
Sec. 19: S½S½	160
Total U.S.F.S.	3,440 acres
Total Acquisition Acreage	8,200 acres

Appendix 2

PRIORITY EASEMENT ACQUISITIONS

Location	Length	Owner
T. 8 N., R. 10 W., NMPM		
Sec 10	0.3 mi.	Adrian Berryhill
T. 8 N., R. 12 N.		
Sec 7	0.8 mi.	Ariz-NM Land Co.
Sec 15	0.1 mi.	Ariz-NM Land Co.
Sec 16	1.2	State
27	0.6	Ariz-NM Land Co.
35	1.1	"
13	1.3	"
30	0.8	Ball & Moore
31	1.1	Ariz-NM Land Co.
T. 7 N., R. 12 W.		
Sec 7	1.2 mi.	"
Sec 19	0.3	"
27	0.2	"
35	0.4	"
T. 8 N., R. 11 W		
Sec 7	1.1	"
T. 8 N., R. 13 W.		
Sec 12	0.2	State
24	0.2	"
T. 9 N., R. 12 W.		
Sec 15	0.3	David Candelaria
22	1.1	"
27	0.3	Margaret Vesper
28	1.2	"
29	1.3	"
30	0.2	"
31	0.9	Stella Springer
32	0.4	"

Appendix 3

Total acreage in proposed Outstanding Natural Area - 122,235.06

Public Domain	64,989.57	53.1%
Private	45,278.77	37.1%
State	11,966.72	9.8%

	PD	Private	State	Total Acreage
T. 6 N., R. 11 W.	12,467.72	480.0	0	12,947.72
T. 6 N., R. 12 W.	80.0	360.10	0	440.10
T. 7 N., R. 10 W.	4,846.17	285.48	0	5,131.65
T. 7 N., R. 11 W.	5,672.19	8,985.73	3,400.07	18,057.99
T. 7 N., R. 12 W.	6,066.82	7,601.14	1,920.56	15,588.52
T. 8 N., R. 9 W.	215.87	39.28	0	255.15
T. 8 N., R. 10 W.	16,737.01	400.0	1,901.44	19,038.45
T. 8 N., R. 11 W.	7,496.36	9,235.84	1,720.00	18,452.20
T. 8 N., R. 12 W.	5,934.71	8,178.12	1,743.93	15,856.76
T. 9 N., R. 9 W.	1,792.72	3,592.12	80.0	5,464.84
T. 9 N., R. 10W.	3,680.00	6,120.96	1,200.72	11,001.68
				122,235.06

(See next page for legal description)

Proposed Malpais Outstanding Natural Area

Legal Description & Acreage

T. 6 N., R. 11 W.

Sec 1: N½, W½SW¼

Sec 2: Lots 1, 2, 3 & 4, S½N½, S½

Sec 3: Lots 1, 2, 3 & 4, S½N½, S½

Sec 4: Lots 1, 2, 3 &4, S½N½, S½

Sec 5: Lots 1, 2, 3 & 4, S½N½, S½

Sec 6: Lots 1, 2, 3, 4, 5, 6 & 7, SE¼NW¼, E½SW¼, S½NE¼, SE¼

Sec 7: Lots 1, 2, 3 & 4, E½W½, E½

Sec 8: All

Sec 9: All

Sec 10: All

Sec 11: N½, SW¼, W½SE¼

Sec 14: NW¼ =
W½SW¼ =

Sec 15: All

Sec 16: All

Sec 17: All

Sec 18: Lots 1, 2, 3 & 4, E½W½, E½

Sec 19: Lots 1, 2, 3 & 4, E½W½, E½

Sec 20: All

Sec 21: All

Sec 22: W½
W½E½
E½NE¼

Sec 27: NW¼, NW¼SW¼

Sec 28: N½N½, SE¼NE¼, NE¼SE¼

Sec 29: N½

Sec 30: NE¼, NE¼NW¼

Totals for T. 6 N., R. 11 W.

PD Land	=	12,467.72
Private	=	480.00
State	=	0
TOTAL		12,947.72

T. 6 N., R. 12 W.

Sec 1: Lots 1 & 2, S½NE¼, SE¼

Sec 12: NE¼NE¼, SE¼SE¼

Sec 13: NE¼NE¼

Totals

PD	80
Private	360.10
State	0
TOTAL	440.10

T. 7 N., R. 10 W.

Sec 4: Lots 7, 8, 9 & 10

Sec 5: Lots 1,2, 3 & 4, S½N½, SW¼, W½SE¼ NE¼SE¼

Sec 6: Lots 1,2, 3, 4, 5, 6, & 7, SE¼NW¼, S½NE¼ SE¼, E½SW¼

Sec 7: Lots 1, 2, 3, & 4, E½W½, E½

Sec 8: W½, W½NE¼

Sec 17: W½, W½E½

Sec 18: Lots 1, 2, 3, & 4, E½W½, E½

Sec 19: Lots 1, 2, 3, & 4, E½W½, E½

Sec 20: W½, W½NE¼

Sec 29: N½NW¼

Sec 30: Lots 1, 2, 3 & 4, NE½NW¼, N½NE¼

Sec 31: Lots 1, 2, 3, & 4

Totals

PD	4,846.17
Private	285.48
State	0
TOTAL	5,131.65

T. 7 N., R. 11 W.

Sec 1: Lots 1, 2, 3, & 4, S½N½, S½

Sec 2: Lots 1, 2, &3, S½NE¼, SE¼NW¼, SE¼, E½SW¼, SW¼SW¼

Sec 3: Lots 2, 3, & 4

Sec 4: Lots 1 2 & 3

Sec 9: S½S½, N½SE¼, SE¼NE¼

Sec 10

Sec 11

Sec 12

Sec 13

Sec 14

Sec 15

Sec 16

Sec 17: S½

Sec 18: S½SE¼, NE¼SE¼

Sec 19: Lots 2,3, &4, E½W½, E½

Sec 20

Sec 21

Sec 22

Sec 23

Sec 24

Sec 25

Sec 26

Sec 27

Sec 28

Sec 29

Sec 30: Lots 1,2, 3 & 4, E½W½, E½

Sec 31: Lots 1, 2, 3 & 4, E½Wp, E½

Sec 32

Sec 33

Sec 34

Sec 35

Sec 36

Totals

PD	5,672.19
Private	8,985.73
State	3,400.07
	18,057.99

T. 7 N., R. 12 W.

Sec 1: Lots 3 & 4, S½NW¼, SW¼NE¼, S½

Sec 2: Lots 1, 2, 3 & 4, S½N½, S½

Sec 3: Lots 1, 2, 3 & 4, S½N½, S½

Sec 4: Lots 1, 2, 3 & 4, S½N½, S½

Sec 5: Lots 1, 2, 3 & 4, S½N½, S½

Sec 6: Lots 1, 2, 3, 4, 5, & 6, SE¼NW¼, S½NE¼, NE¼, SW¼, SE¼

Sec 7: E½

Sec 8

Sec 9

Sec 10

Sec 11

Sec 12

Sec 13: W½, W½E½, NE¼NE¼

Sec 14

Sec 15

Sec 16

Sec 17

Sec 18: NE¼, N½SE¼, SE¼SE¼

Sec 20: NE¼, N½NW¼, SE¼NW¼

Sec 21: N½, N½S½, SE¼SE¼

Sec 22:

Sec 23

Sec 24: W½W½, E½NW¼, NW¼NE¼, E½SE¼, SW¼SE¼

Sec 25: E½, SW¼, SE¼, NW¼

Sec 26: W½, W½ NE¼, NE¼NE¼

Sec 27: All

Sec 28: E½E½

Sec 34: N½NE¼

Sec 35: N½NW¼

Sec 36 All

Totals

PD	6,066.82
Private	7,601.14
State	1,920.56
	15,588.52

T. 8 N., R. 9 W.

Sec 6: Lots 8, 9, 10, 11, 15 & 16

Sec 7: Lots 1 - 38.82

Lots 2 39.28

PD	215.87
Private	39.28
Total	255.15

T. 8 N., R. 10 W.

Sec 1:

Sec 2:

Sec 3:

Sec 4:

Sec 5:

Sec 6: S½
S½NE¼

Sec 7

Sec 8

Sec 9

Sec 10

Sec 11

Sec 12: All

Sec 13: N½NW¼
NW¼NE¼

Sec 14

Sec 15

Sec 16

Sec 17

Sec 18

Sec 19

Sec 20

Sec 21

Sec 22

Sec 23: W½
W½E½
E½NE¼
NE¼SE¼

Sec 26: NW¼
NW¼SW¼
SE¼SW¼
SW¼SW¼

Sec 27

Sec 28

Sec 29

Sec 30

Sec 31

Sec 32

Sec 33

Sec 34: N½, W½SW¼

Sec 35: W½NW¼

Totals

PD	16,737.01
Private	400.00
State	1,901.44
	19,038.45

T. 8 N., R. 11 W.

Sec. 1: S½

Sec. 2: S½

Sec. 4: N½NW¼, NW¼NE¼

Sec. 5:

Sec. 6: Lots 1, 2, 3, 4, 5, 6, & 7, SE¼NW¼, S½NE¼, SE¼, E½SW¼

Sec. 7: Lots 1, 2, 3 & 4, E½W½, E½

Sec. 8:

Sec. 9: SW¼

Sec. 11:

Sec. 12:

Sec. 13:

Sec. 14:

Sec. 16: W½

Sec. 17:

Sec. 18: Lots 1, 2, 3 & 4: E½W½, E½

Sec. 19: Lots 1, 2, 3 & 4: E½W½, E½

Sec. 20:

Sec. 21:

Sec. 22:

Sec. 23:

Sec. 24:

Sec. 25:

Sec. 26:

Sec. 27:

Sec. 28:

Sec. 29:

Sec. 30: Lots 1, 2, 3 & 4, E½W½, E½

Sec. 31: N½NE¼, NE¼NW¼, SE¼NE¼

Sec. 32: N½, N½SE¼, NE½SW¼

Sec. 33:

Sec. 34:

Sec. 35:

Sec. 36:

Totals		
	Public Domain	7,496.36
	Private	9,235.84
	State	1,720.00
		17,452.20 acres

T. 8 N., R. 12 W.

Sec 1: Lots 1, 2, 3 & 4, S½N½, S½
Sec 2: Lots 1, 2, 3 & 4, S½N½, S½
Sec 3: Lots 1, 2, 3 & 4, S½N½, S½
Sec 4: Lots 1, 2, 3 & 4, S½N½, SE¼, E½SW¼
Sec 5: Lot 1
Sec 9: E½, E½W½
Sec 10
Sec 11
Sec 12
Sec 13
Sec 14
Sec 15: N½, N½S½
Sec 16: NE¼, E½NW¼, N½SE¼, NE¼SW¼
Sec 19: S½SE¼
Sec 20: S½S½
Sec 21: S½S½
Sec 22: S½S½
Sec 23
Sec 24
Sec 25
Sec 26
Sec 27
Sec 28
Sec 29
Sec 30: Lots 2,3 & 4, E½SW¼, SE¼, NW¼, E½
Sec 31: Lots 1, 2, 3 & 4, E½W½, E½
Sec 32
Sec 33
Sec 34
Sec 35
Sec 36: W½NW¼, NW¼SW¼

Totals

PD	5,934.71
Prvate	8,178.12
State	1,743.93
	15,856.76

T. 9 N., R. 9 W.

Sec 5: Lots 2,3 & 4, SW¼, S½NW¼, SW¼NE¼

Sec 6: Lots 1,2, 3, 4, 5, 6 & 7, SE¼NW¼, S½NE¼, E½SW¼, SE¼

Sec 7: Lots 1, 2, 3 & 4, E½W½, E½

Sec 8: W½W½, NE¼NW¼

Sec 17: SW¼, W½NW¼

Sec 18: Lots 1, 2, 3 & 4, E½W½, E½

Sec 19: Lots 1, 2, 3 & 4, E½W½, E½

Sec 20: W½

Sec 29: W½, W½E½

Sec 30: Lots 1,2, 3 & 4, E½W½, E½

Sec 31: Lots 1, 2, 3& 4, E½W½, NE¼, W½SE¼

Sec 32: W½NW¼

Totals

PD	1,792.72
Private	3,592.12
State	80.00
	5,464.84

T. 9 N., R. 10 W.

Sec 1: Lots 1, 2, 3 & 4, S½N½, S½

Sec 2: Lots 1, & 2, S½NE¼, S½

Sec 10: E½E½

Sec 11

Sec 12

Sec 13

Sec 14

Sec 15: E½ E½

Sec 21: S½SE¼, SE¼SW¼, NE¼SE¼

Sec 22: S½, NE¼

Sec 23

Sec 24

Sec 25

Sec 26

Sec 27

Sec 28: E½, E½W½

Sec 32: SE¼

Sec 33: S½, NE¼, S½NW¼, NE¼NW¼

Sec 34

Sec 35

Sec 36

Totals

PD	3,680.00
Private	6,120.96
State	1,200.72
	11,001.68

Appendix 4

Total acreage in proposed buffer zone -	37,164.60	
Public Domain	14,310.84	38.5%
Private	17,478.82	47.1%
State	4,254.50	11.4%
U.S. Forest Service	1,120.44	3.0%

(See next page for legal description)

Proposed Buffer Zone

T. 6 N., R. 10 W.

Sec. 6: Lots 3, 4, 5 & 6

Totals for T. 6 N., R. 10 W.

Private	123.71
Public Domain	41.56

T. 6 N., R. 11 W.

Sec. 1: E½SW¼, W½SE¼, NE¼SE¼

Sec. 12: NW¼, NW¼NE¼, NW¼ SW¼

Sec. 14: NE¼, E½SW¼, W½SE¼, NE¼SE¼

Sec. 22: E½SE¼

Sec. 23: NW¼, W½NE¼, N½SW¼, SW¼SW¼

Sec. 26: NW¼NW¼

Sec. 28: SW¼, S½NW¼, S½SE¼, NW¼SE¼, SW¼NE¼

Sec. 29: S½

Sec. 30: Lots 1, 2 & 3
SE¼NW¼, E½SW¼, SE¼

Sec. 31: N½NE¼

Sec. 32: N½N½

Sec. 33: N½N½

Sec. 34: NW¼NW¼
NE¼NW¼

Totals for T. 6 N., R. 11 W.

Private	1,160.00
Public Domain	1,617.51

T. 6 N., R. 12 W.

Sec. 1: Lots 1, 2
S½NW¼, SW¼

Sec. 2: Lots 1, 2, 3, & 4
S½N½, SE¼, E½SW¼

Sec. 3: Lots 1 & 2

Sec. 11: NE¼NW¼, N½NE¼, SE¼NE¼, NE¼SE¼

Sec. 12: NW¼, N½SW¼, SE¼SW¼, W½NE¼, SE¼NE¼, N½SE¼, SW¼SE¼

Sec. 13: W½E½, E½SE¼, SE¼NE¼

Sec. 24: E½

Sec. 25: N½NE¼, SE¼NE¼

Totals for T. 6 N., R. 12 W.

Private	1,000.30
Public Domain	760.00
State	560.56

T. 7 N., R. 10 W.

Sec. 3: Lots 3 & 4

Sec. 4: Lots 5, 6, 7, 9, 10, 15, 16 & 17

Sec. 5: SE¼SE¼

Sec. 8: SE¼, E½NE¼

Sec. 17: E½E½

Sec. 20: E½NE¼
N½SE¼, SW¼SE¼

Sec. 29: S½NW¼, W½NE¼

Sec. 30: S½NE¼, E½SW¼, SE¼NW¼

Sec. 31: E½W½

Totals for T. 7 N., R. 10 W.

Private	400.00
Public Domain	1,244.37

T. 7 N., R. 11 W.

Sec. 2: Lot 4
SW¼NW¼, NW¼SW¼

Sec. 3: Lot 1
S½N½, S½

Sec. 4: Lot 4
S½N½, S½

Sec. 5: Lots 1,2,3, & 4
S½N½, S½

Sec. 6: Lots 1, 2, 3, 4, 5, 6, & 7
SE¼NW¼, S½NE¼, E½SW¼, SE¼

Sec. 7: Lots 1, 2, 3 & 4
E½W½, E½

Sec. 8: All

Sec. 9: NW¼, N½NE¼, SW¼NE¼, N½SW¼

Sec. 17: N½

Sec. 18: Lots 1, 2, 3, 4
E½W½, NE¼, NW¼SE¼

Sec. 19: Lots 1 & 2 NE¼NW¼

Totals for T. 7 N., R. 11 W.

Private	2,582.94
Public Domain	2,307.80
State	119.81

T. 7 N., R. 12 W.

Sec. 1: Lots 1 & 2, SE¼NE¼

Sec. 6: Lot 7, SE¼SW¼

Sec. 7: Lots 1, 2, 3, 4, E½W½

Sec. 13: E½SE¼, SE¼NE¼

Sec. 18: Lots 1 & 2, E½NW¼
Lots 3 & 4, E½SW¼

Sec. 19: Lot 2, NE¼, N½SE¼, E½NW¼
Lot 1

Sec. 20: SW¼, SW¼NW¼, S½SE¼, NW¼SE¼

Sec. 21: S½SW¼, SW¼SE¼

Sec. 24: E½NE¼, SW¼NE¼, NW¼SE¼, E½SW¼

T. 7 N., R. 12 W. (cont'd)

Sec. 25: N½NW¼, SW¼NW¼

Sec. 26: SE¼, SE¼NE¼

Sec. 28: W½, W½E½

Sec. 29: NE¼, N½NW¼, N½SE¼

Sec. 33: NE¼, N½NW¼, N½SE¼

Sec. 34: NW¼, N½SW¼, SE¼, S½NE¼

Sec. 35: S½, NE¼, S½NW¼

Totals for T. 7 N., R. 12 W.

Private	2,338.40
Public Domain	1,946.73
State	151.11

T. 7 N., R. 13 W.

Sec. 1: Lots 1, 2, S½NE¼, SE¼

Sec. 12: N½NE¼

Totals for T. 7 N., R. 13 W.

Public Domain	400.16

T. 8 N., R. 9 W.

Sec. 5: Lot 4, SWPNWP, W½SW¼

Sec. 6: Lots 1, 2, 12, 13, 14, 17, 18, 19
SE¼NE¼, NE¼SE¼

Sec. 7: Lot 4, NE¼, NE¼NW¼, NW¼SE¼
Lot 3, NE¼SW¼, SE¼NW¼

Totals for T. 8 N., R. 9 W.

Private	119.72
Public Domain	766.08

T. 8 N., R. 10 W.

Sec. 6: Lots 1, 2, 3, 4, 5, SE¼NW¼

Sec. 13: E½NE¼ to Indian border, W½SE¼
SW¼, S½NW¼, SW¼NE¼

T. 8 N., R. 10 W. (cont'd)

Sec. 23: SE¼SE¼

Sec. 24: W½W½, NE¼NW¼

Sec. 26: NE¼NE¼, SW¼NE¼, W½SE¼, SE¼SW¼
NW¼NE¼

Sec. 34: NE¼SW¼
N½SE¼, SW¼SE¼, SE¼SW¼

Sec. 35: N½SW¼, E½NW¼

Totals for T. 8 N., R. 10 W.

Private	1,497.91
Public Domain	250.00

T. 8 N., R. 11 W.

Sec. 1: Lots 1, 2, 3, 4, S½N½

Sec. 2: Lots 1, 2, 3, 4, S½N½

Sec. 3: Lots 1, 2, 3, 4, S½N½, S½

Sec. 4: Lots 1, 2, 3, 4, S½N½, S½

Sec. 5: Lots 1, 2, 3, 4, S½N½, SE¼

Sec. 9: N½, SE¼

Sec. 10: N½
S½

Sec. 15: All

Sec. 16: E½

Sec. 31: Lots 1, 2, 3, 4, SE¼NW¼, E½SW¼
SW¼NE¼, SE¼

Sec. 32: SW¼, S½SE¼

Totals for T. 8 N., R. 11 W.

Private	2.060.09
Public Domain	2,031.40
State	862.84

T. 8 N., R. 12 W.

Sec. 4: W½SW¼

Sec. 5: Lots 2, 3, 4, S½N½, S½

Sec. 6: Lot 1, SE¼NE¼, E½SE¼

T. 8 N., R. 12 W. (cont'd)

Sec. 7: NE¼NE¼

Sec. 8: N½, SE¼

Sec. 9: W½W½

Sec. 15: S½SW¼
S½SE¼

Sec. 16: W½W½, SE¼SW¼, S½SE¼

Sec. 17: S½, NE¼

Sec. 19: E½NE¼, N½SE¼, E½SW¼

Sec. 20: N½, N½S½

Sec. 21: N½, N½S½

Sec. 22: N½, N½S½

Sec. 30: Lot 1, NE¼NW¼

Sec. 36: E½, E½W½, SW¼SW¼

Totals for T. 8 N., R. 12 W.

Private	1,555.41
Public Domain	2,345.23
State	800.00

T. 8 N., R. 13W.

Sec. 25: E½

Sec. 36: E½

Totals for T. 8 N., R. 13 W.

Public Domain	320.00
State	320.00

T. 9 N., R. 9 W.

Sec. 5: Lot 1, SE¼NE¼, N½SE¼, SW¼SE¼

Sec. 8: W½NE¼
SE¼NW¼, E½SW¼

Sec. 17: E½NW¼, SW¼NE¼, W½SE¼

Sec. 20: W½E½, SE¼SE¼

Sec. 29: E½E½

T. 9 N., R. 9 W. (cont'd)

Sec. 31: SE¼

Sec. 32: SW¼, E½NW¼, W½NE¼, NE¼NE¼

Totals for T. 9 N., R. 9 W.

Private	680.40
Public Domain	120.00
State	360.00

T. 9 N., R. 10 W.

Sec. 2: Lot 4, SW¼NW¼
Lot 3, SE¼NW¼

Sec. 3: Lots 1, 2, S½NE¼, SE¼NW¼, S½

Sec. 9: SE¼, E½NE¼

Sec. 10: W½, W½NE¼

Sec. 15: W½

Sec. 16: E½, E½SW¼

Sec. 21: NE¼, W½SW¼, NE¼SW¼, NW¼SE¼
S½NW¼

Sec. 22: NW¼

Sec. 28: W½W½

Sec. 29: S½SE¼, SE¼SW¼, SE¼NE¼

Sec. 31: S½SE¼

Sec. 32: NE¼, E½W½, SW¼SW¼

Totals for T. 9 N., R. 10 W.

Private	2,200.24
Public Domain	160.00
State	760.18

T. 9 N., R. 11 W.

Sec. 31: Lots 3, 4, E½SW¼SE¼

Sec. 32: S½

Sec. 33: SW¼

Totals for T. 9 N., R. 11 W.

U.S. Forest Service	800.44

T. 9 N., R. 12 W.

Sec. 31: E½SE¼
Sec. 32: S½
Sec. 33: S½
Sec. 34: S½
Sec. 35: S½
Sec. 36: S½

Totals for T. 9 N., R. 12 W.

Private	1,360.00
U.S. Forest Service	320.00

T. 10 N., R. 9 W.

Sec. 31: Lot 4, SE¼SW¼, S½SE¼
Sec. 32: S½S½

Totals for T. 10 N., R. 9 W.

Private	159.70
State	160.00

T. 10 N., R. 10 W.

Sec. 34: S½SE¼
Sec. 35: S½S½
Sec. 36: S½S½

Totals for T. 10 N., R. 10 W.

Private	240.00
State	160.00

Total acreage in supplemental area - 10,960 acres

Private	6,880
U.S.F.S.	4,080

Legal Description

T. 9 N., R. 11 W.

Sec. 19: S½S½
Sec. 28: SW¼, SW¼SE¼
Sec. 29: S½, S½N½, NW¼NW¼
Sec. 30:
Sec. 31:
Sec. 32:
Sec. 33:

Total (All U.S.F.S.) 3,440 acres

T. 9 N., R. 12 W.

Sec. 21: E½SE¼, SE¼NE¼
Sec. 22: S½, NE¼, S½NW¼
Sec. 23:
Sec. 24:
Sec. 25:
Sec. 26:
Sec. 27:
Sec. 28: S½, NE¼, SE¼NW¼
Sec. 29: S½SE¼
Sec. 32: E½, E½W½
Sec. 33:
Sec. 34:
Sec. 35:
Sec. 36:

Private	6,880
U.S.F.S.	640
TOTAL	7,520 acres

Appendix 6

Malpais Development Summary

Site #1 — Administrative Site

Administrative Bldg/Visitor Center
Maintenance Complex -
- Warehouse
- Yard
- Fire Cache
- Storage

Site #2 — Kipuka Interpretive Foot Trail

Self-guiding foot trail across lava flows - brochure
trail designed to accomodate the handicapped

Site #3 — Bandera Auto Interpretive Trail

Self-guiding interpretive road through rugged lava - brochure
keyed by roadside feature markers

Site #4 — Bandera Flow Overlook

Overlook shelter - interpretive display
small picnic area

Site #5 — Bat Cave (within Cibola N.F.)

Interpretive trail through lava tube
(⅓ mile - lighted) - interpretive displays

Site #6 — El Calderon (Cinder Cone - within Cibola N.F.)

Interpretive display showing formation of cinder cone and lava tubes
Nature trail around rim of cone

Site #7 — Bandera Crater Viewpoint (on private land)

Parking area with interpretive display of formation of Bandera Crater

Site #8 — Cerro Rendija Trails

3.5 miles of foot trails to significant lava tubes and other lava features
small picnic area

Site #9 — Aa Lava Foot Trail

Improve old Indian trail across rugged Aa lava field

Site #10 — Mesita Blanca Foot Trail

Old road to be closed to vehicles - trail provides unique hiking experience through variety of flows and vegetation types

Site #11 — Cerro Encierro Campground

Small primitive campground (only campground planned)
Short foot trail to top of cinder cone

Site #12 — Narrows Indian Foot Trail

Improve and mark old Indian trail across Pahoehoe lava flow

Site #13 — Narrows Overlook

Construct new road to overlook of Malpais facility with interpretive display
Small picnic area

Site #14 — Narrows Arch

Short road to viewpoint of natural sandstone arch with interpretive display

Site #15 — Cliffs Picnic Area

Picnic area (about 12 units)
Overlook of Malpais

Site #16 — McCarty's Trail

Foot trails across lava to Kipuka (island)

Site #17 — Great Kiva Ruin (private and State land)

Excavated and restored site with Great Kiva and numerous other structures. An interpretive shelter foot trail connecting to Site #16

MALPAIS OUTSTANDING NATURAL AREA

DEVELOPMENT SCHEDULE

Site/Development	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8	
	*S&D	Const	S&D	Const	S&D	Const	S&D	Const	S&D	Const	S&D	Const	S&D	Const	S&D	Const
Recreation Development																
Site # 1	x			x												
# 2			x			x										
# 3			x			x										
# 5	x			x												
# 6	x			x												
# 7			x			x										
# 8			x			x										
# 9					x			x								
#10							x			x						
#11					x			x								
#12									x			x				
#13							x			x						
#14									x			x				
#15			x			x										
#16					x			x								

Site/Development	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8	
	* S&D	Const	S&D	Const	S&D	Const	S&D	Const	S&D	Const	S&D	Const	S&D	Const	S&D	Const
Road Construction																
Site # 1	x			x												
# 3	x			Base		Pave										
# 5			x			Base		Pave								
# 6			x			Base		Pave								
# 8					x			Base		Pave						
# 9							x			x						
#10							x			x						
Hole-In-The-Wall							x			x						
#11					x			x								
#13					x			Base		Const						
#14									x			Base		Const		
#15			x			x										
#16							x			x						
#17			x			x										
West Side Drive					x			Base		Const						

* Survey and Design

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plan review & approval

Plan Review and Approval

Prepared and submitted by: Richard L. Bundt — Outdoor Recreation Planner — 11/2/72 — Date

Reviewed: _____ — Rio Puerco Area Manager, Albuquerque District — _____ — Date

Reviewed: _____ — San Augustine Area Manager Socorro District — _____ — Date

Approved: _____ — Albuquerque District Manager — _____ — Date

Approved: _____ — Socorro District Manager — _____ — Date

Concurred: _____ — State Director — _____ — Date

base map and overlays

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AND

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